CLAIMS

What is claimed is:

1. A method for self-routing a packet through a $b2^n \times b2^n$ switching network, the network comprising 2^n output groups, each of the output groups having a distinct n-bit binary output group address in the form of $b_1b_2...b_n$ with b indistinguishable output ports, and k super-stages of multicast concentrators wherein each of the multicast concentrators is a 2b×2b multi-stage interconnection network of bicast cells, and b of its 2b output ports are grouped into a 0-output group while the remaining b output ports are grouped into a 1-output group, the network being characterized by the guide $\gamma(1), \gamma(2), \ldots, \gamma(k)$, where γ is a mapping from the set $\{1, 2, \ldots, k\}$ to the set $\{1, 2, \ldots, n\}$, and the packet being either a real data packet destined for a rectangular set of output group addresses represented by a quaternary sequence $Q_1, Q_2, \ldots, Q_n$, where each Q_j is a quaternary symbol in any of the three values representing '0-bound', '1-bound' or 'bicast', or being an idle packet having no pre-determined destination, the method comprising

generating a routing tag $Q_{\gamma(1)}Q_{\gamma(2)}...Q_{\gamma(k)}$ for the packet with reference to the guide and the destination output group address of the packet, wherein each $Q_{\gamma(j)}$, $1 \le j \le k$, has a value representing 'idle' if the packet is an idle packet or has one of the three values representing '0-bound', '1-bound' or 'bicast', and

routing the packet through the network by using $Q_{\gamma(j)}$ in the routing tag of the packet in the j-th stage multicast concentrator, $1 \leq j \leq k$, to select an output group or both output groups from the j-th super-stage multicast concentrator to emit the packet.

2. A system for self-routing a packet comprising

a $b2^n \times b2^n$ switching network, the network comprising 2^n output groups, each of the output groups having a distinct n-bit binary output group address in the form of $b_1 b_2 \ldots b_n$ with b indistinguishable output ports, and k super-stages of multicast concentrators wherein each of the multicast concentrators is a 2b×2b multi-stage interconnection network of bicast cells, and b of its 2b output ports are grouped into a 0-output group while the remaining b output ports are grouped into a 1-output group, the network being characterized by the guide $\gamma(1), \gamma(2), \ldots, \gamma(k)$, where γ is a mapping from the set $\{1, 2, \ldots, k\}$ to the set $\{1, 2, \ldots, n\}$, and the packet being either a real data packet destined for a rectangular set of output group addresses represented by a quaternary sequence $Q_1, Q_2, \ldots, Q_n$, where each Q_j is a quaternary symbol in any of the three values representing '0-bound', '1-bound' or 'bicast', or being an idle packet having no pre-determined destination,

a generator for generating a routing tag $Q_{\gamma(1)} Q_{\gamma(2)} \ldots Q_{\gamma(k)}$ for the packet with

reference to the guide and the destination output group address of the packet, wherein each $Q_{\gamma(j)}$, $1 \leq j \leq k$, has a value representing 'idle' if the packet is an idle packet or has one of the three values representing '0-bound', '1-bound' or 'bicast', and

routing circuitry for routing the packet through the network by using $Q_{\gamma(j)}$ in the routing tag of the packet in the j-th stage multicast concentrator, $1 \leq j \leq k$, to select an output group or both output groups from the j-th super-stage multicast concentrator to emit the packet.